

RE: Your inquiry through  
ELECTRONIC PRODUCTS

ATTENTION: Mr. T. Nelson

A bulletin is enclosed on the Model KP15 Pressure Transducer Kit, along with a sheet on the Model CD25 Transducer Indicator, a recent addition to our product line. Both are available from stock.

The Model CD25 Transducer Indicator is priced at \$400.00, and the Model KP15 Pressure Transducer Kit at \$375.00.

For users who do not need the readout feature the basic Model CD10 Carrier-Demodulator, without indicator, as described in the enclosed sheet, is also stocked at \$300.00 each.

We shall be happy to send you a catalog describing our complete instrumentation line.

**PACE** *engineering company*

13035 Saticoy Street, North Hollywood, California 91605

Phone: 213-877-0727

Twx: 213-765-5299

## PRESSURE TRANSDUCER KIT

1 % Reading Accuracy, 1 - 500 psi.

Ranges of  $\pm 1$ ,  $\pm 5$ ,  $\pm 25$ ,  $\pm 100$ ,  
 $\pm 500$  psi; Gage or Differential.

Withstands extreme pressure overloads.

High natural frequency.

Accepts corrosive liquids and gases,  
both sides.

Low sensitivity to mechanical shock.

### MODEL KP15



The Model KP15 Pressure Transducer Kit, intended for general test laboratory use, provides multirange capability with the use of interchangeable diaphragms, eliminating the need to stock several individual pressure transducers. The transducer is a typical PACE split body design, in which pressure is sensed through the deflection of a flat magnetic stainless diaphragm located between two magnetic pickoff coil assemblies potted one in each of the body halves. Motion of the diaphragm results in change in inductance ratio between the pickoff coils and the effect is utilized in a bridge circuit to produce an output voltage proportional to pressure.

The instrument is easily disassembled for diaphragm replacement by removing four bolts. Hardwood case, wrenches, spare seals and accessories are included in the kit. Stainless steel construction allows exposure to corrosive liquids and gases on both sides for differential pressure applications. Vent valves facilitate complete liquid filling for dynamic measurement. The transducer operates with carrier systems, including the PACE Model CD10 with 5 volt DC output, and the PACE Model CD25 meter readout type.

#### SPECIFICATIONS

**Ranges:**  $\pm 1$ ,  $\pm 5$ ,  $\pm 25$ ,  $\pm 100$ ,  $\pm 500$  psi,  
Gage or Differential.

**Linearity:**  $\pm \frac{1}{2}$  % best straight line.

**Hysteresis:**  $\pm \frac{1}{4}$  % pressure excursion.

**Overpressure:** 200 psi or 200% range,  
whichever is greater.

**Line Pressure:** 2,000 psi maximum.

**Output:** 50 mv/v full scale at 3,000 cps.

**Inductance:** 20 mh nominal, each coil,  
zero balance within 10% full scale.

**Excitation:** 1,000-20,000 cps.  
30 volts max. at 3000 cps.

**Pressure Media:** Corrosive liquids  
and gases, both sides.

**Temperature:** Ambient range  $-65^{\circ}$  to  $250^{\circ}$  F.  
Zero shift coefficient within 0.01% of  
full scale per  $^{\circ}$  F. Sensitivity coefficient  
within 0.02% per  $^{\circ}$  F.

**Pressure Cavity Volume:**  $4 \times 10^{-3}$  cubic inch.

**Volumetric Displacement:**  $3 \times 10^{-4}$  cubic inch,  
full scale.

#### Acceleration Response, most sensitive axis:

| Range         | Static  | Vibratory | Nat. Freq. |
|---------------|---------|-----------|------------|
| $\pm 1$ psi   | .2%/g   | .2%/g     | 5 Kcps     |
| $\pm 5$ psi   | .06%/g  | .06%/g    | 8 Kcps     |
| $\pm 25$ psi  | .02%/g  | .02%/g    | 14 Kcps    |
| $\pm 100$ psi | .01%/g  | .01%/g    | 25 Kcps    |
| $\pm 500$ psi | .003%/g | .003%/g   | 40 Kcps    |

**Installation Details:** See drawing on back.

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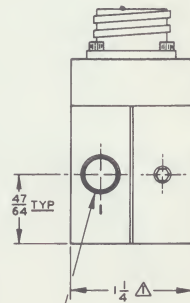
# INSTALLATION DRAWING

## Model KP15 Pressure Transducer Kit

### ACCESSORY AND SPARE PARTS LISTS

| DESCRIPTION                                                                                       | QTY. |
|---------------------------------------------------------------------------------------------------|------|
| HEX SOCKET WRENCH - $\frac{5}{64}$ ACROSS FLATS                                                   | 1    |
| SPLINE SOCKET WRENCH .183 DIA. - BRISTOL NO. S-183                                                | 1    |
| O'RING - PARKER 2-24 COMPOUND BUNA-N 219-7                                                        | 2    |
| DIAPHRAGMS (EACH IDENTIFIED FOR RANGE)                                                            | 4    |
| AN816-2C NIPPLE-FLARED TUBE AND PIPE THREAD<br>( $\frac{1}{8}$ PIPE TO $\frac{1}{8}$ O.D. TUBING) | 2    |
| AN816-4C NIPPLE-FLARED TUBE AND PIPE THREAD<br>( $\frac{1}{8}$ PIPE TO $\frac{1}{4}$ O.D. TUBING) | 2    |
| ELECTRICAL CONNECTOR PLUG - CANNON WK-4-21C- $\frac{3}{8}$                                        | 1    |
| BLEED SCREW - PACE PART NO. 4001-3 (18-8 SST.)                                                    | 2    |
| GASKET, BLEED SCREW - PACE PART NO. 4002-1 (TEFLON)                                               | 2    |

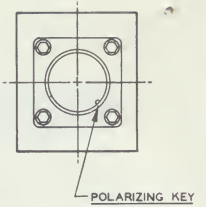
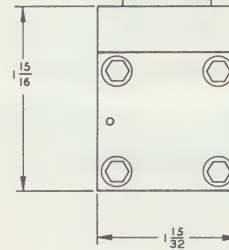
TOLERANCE: UNLESS NOTED  $\pm \frac{1}{16}$



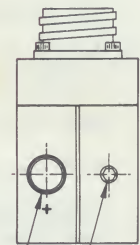
NEGATIVE PRESSURE PORT:  
 $\frac{1}{8}$  - 27NPT

NOTE  
 $\Delta$  THIS DIMENSION VARIES WITH PRESSURE RANGE.  
 2 POSITIVE PRESSURE INCREASES  $L_2$  AND DECREASES  $L_1$ .

ELECTRICAL CONNECTOR:  
WK-4-323

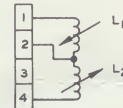


POLARIZING KEY



BLEED SCREW - 2 PLACES

POSITIVE PRESSURE PORT:  
 $\frac{1}{8}$  - 27NPT



## INSTRUCTIONS FOR DIAPHRAGM REPLACEMENT

### Model KP15 Pressure Transducer

To replace the diaphragm, the transducer may be disassembled by removing the four #10-32 Bristol Spline type cap screws. The body blocks are then separated and the diaphragm is removed and replaced with the new one. Screws are replaced and gradually tightened in rotation to a maximum torque of about 20 in. lbs. (This value is not critical). The working area should be reasonably clean to avoid inclusion of material particles between the body blocks and the diaphragm, which might prevent proper clamping and introduce hysteresis effects.

The diaphragm is sealed against the body on each side with an O ring, which may stick to the diaphragm on removal. If this should hap-

pen the block may be opened further, exposing the grooves in which the O rings should be installed prior to installation of the new diaphragm. Bleed screws in the body halves of the Model KP15 permit expulsion of air in filling with liquid. Also these may be used for flushing and drying when changing from liquid to gaseous working fluids. In operating with gases the internal cavities must be dry. Drop-lets between the diaphragm and case are capable of causing surface tension effects noticeable in measuring very low pressures.

After assembly, the instrument may be calibrated against a pressure standard appropriate for the pressure range.

Design improvements may be made without prior announcement.

For Models to meet Special Requirements, consult our Engineering staff. Collect calls will be accepted for application and engineering assistance.

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# PACE



## TRANSDUCER INDICATOR

- Analog and Digital readout capabilities.
- 1 % Accuracy taut band meter.
- $\pm 10$  VDC full scale output.
- Range of 0 - 1,000 cps for indicating and recording dynamic and static phenomena.

### MODEL CD25

The Model CD25 Transducer Indicator operates with Pace Variable Reluctance Transducers to provide a direct reading measurement system. The reading appears as a 5" meter indication with  $\pm 1\%$  full scale accuracy or as a 3 digit dial reading, using the meter as a null balance indicator. The Model CD25 also provides a separate  $\pm 10$  volt DC full scale output suitable for indicating and recording dynamic as well as static phenomena over the range 0-1000 cps. AC excitation at 5 Kcps is applied to the transducer in a bridge circuit, the transducer output resulting in a bridge unbalance signal which is amplified and demodulated. The carrier-demodulator system is solid state, operates with 115 volt 60 cps power at one watt.

#### SPECIFICATIONS

**Power:**\* 95-125 Volts, 60 cps at 1 watt.

**Regulation:**  $\pm 0.1\%$  of reading.

**Sensitivity:** Full scale indication corresponds to 20 mv/v transducer input.

**Stability:**  $\pm \frac{1}{2}\%$  long term.

**Indicating Meter:** 5" taut band suspension  $\pm 1\%$  full scale accuracy.

**Meter Scale:** Zero center  $\pm 100$ , 100 divisions.  
Zero center  $\pm 30$ , 60 divisions.

**Temperature Range:** 40°F to 120°F.

**Installation Details:** See drawing.

**Weight:** 6 Lbs.

#### External Output:

**Level:**  $\pm 10$  volts DC full scale, may be suppressed to zero with suppression control.

**Impedance:** 100 ohms nominal.

**Frequency Response:** Flat 0-1000 cps within  $\pm 5\%$ .

**Ripple:** 10 mv rms, max.

#### Controls:

**Meter Sensitivity Switch:** 100%, 30%, 10% transducer output = full scale. 100%, 30%, 10% = full scale with suppression circuit actuated.

**Zero adjustment:** 10 turn potentiometer with dial reading to 3 figures.

**Span adjustment:** 10 turn potentiometer with dial reading to 3 figures.

**Suppression adjustment:** 10 turn potentiometer with 3 digit reading.  
(Also used as readout in null balance operating mode)

**Polarity Switch:** Reverses demodulator output to allow suppression of negative transducer signals.

*\*Battery powered model available on special order.*

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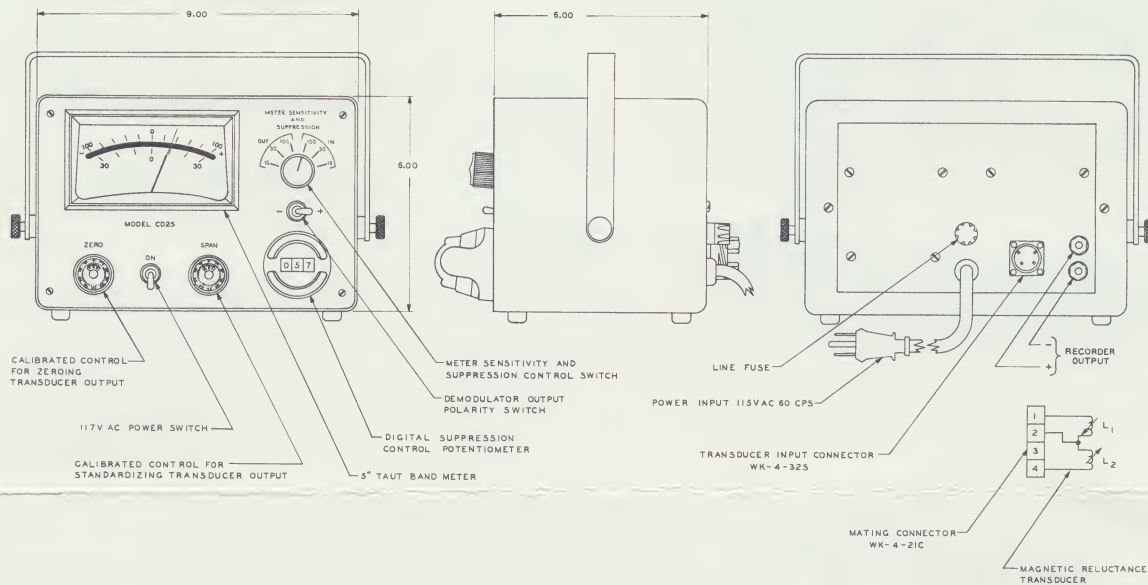
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# INSTALLATION DRAWING

## Model CD25 Transducer Indicator



### OPERATION

The transducer cable connection is made at the rear panel, referring to wiring diagram in drawing. 115 Volt power is applied. The meter sensitivity switch is turned to the "100, suppression out" position and zero and span controls turned to midscale, 50.0. The power switch is placed in the "ON" position and the zero adjusted for zero meter reading. The transducer is brought to the appropriate full scale output for calibration. For example, a 0-50 psi range pressure transducer would be connected to a pressure source monitored at 50 psi with a dead weight tester or precision gage. With the polarity switch in the plus position the span control is now turned to produce the desired full scale reading. This might be 100 for "percent full scale" indication, or 50 for indication in units of psi. Zero and span adjustment readings may now be recorded and used to avoid the necessity for recalibration in setting up the equipment at a later date. If the meter scale now reads directly in psi units with the sensitivity switch in the "100" position, it will also read in psi units in the "30" and "10" positions.

With the meter switch in any of the "suppression in" positions, the suppression control in the lower right corner of the panel becomes effective. It is turned to restore the meter pointer to the zero position, its reading then corresponding to the initial meter deflection. Final adjustment should be made with the meter sensitivity switch in the "10, suppression" in position. In the above example, with 50 psi applied the suppression control would read 50.0, corresponding to meter null. Precise calibration with the span control would be made in this manner rather than by the meter deflection method. If the transducer measured differential pressure, and the pressure were reversed, it would be necessary to switch to the negative position for this procedure. To measure small pressure fluctuations, for example  $\pm 5$  psi in the neighborhood of 60 psi, the suppression control may be turned to read 60.0 and the meter sensitivity switch "10 suppression in". The fluctuation readings then appear as pointer movements between -50 and +50 on the upper meter scale.

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# PACE



## CARRIER-DEMODULATOR

### DC OUTPUT

- Output — 0-5 V DC, operating with Pace Transducers.
- Compact — mounts inside Recorder.
- Regulated against Line Voltage Variation.
- Transistorized for reliability.

## MODEL CD10

The Model CD10 Miniature Carrier-Demodulator, designed for operation on 95-125 volts, 60 cps at 1 watt, operates with PACE Variable Reluctance Transducers in DC systems. Excitation of 5 K cps is applied to a bridge including the two inductance ratio arms of the transducer. A solid-state amplifier and demodulator converts the bridge output to DC. Response is flat to 1,000 cps. Small enough to be included in the case of most receiving and recording instruments, the Model CD10 is regulated against input voltage variation and will operate reliably over an ambient range of 40°F to 120°F.

### SPECIFICATIONS

**Power Requirements:** 95-125 Volts, 60 cps at 1 watt.

**Output:**\* 0-10 VDC (0-2.5 ma short circuit current) or  $\pm 10$  VDC full scale. Regulated against input voltage variation.

**Output Impedance:** 2,000 ohms, nominal.

**Carrier Frequency:** 5 K cps.

**Frequency Response:** Flat 0-1,000 cps, within  $\pm 5\%$ .

**Stability:**  $\pm 1/2\%$ , long term.

**Ripple:** 10 mv max. rms.

**Temperature Range:** 40°F to 120°F.

**Ambient Thermal Effect:** Zero,  $.01\%/^{\circ}\text{F}$ .  
Gain,  $.02\%/^{\circ}\text{F}$ .

**Installation Details:** See drawing on back.

**Weight:** 18 ounces.

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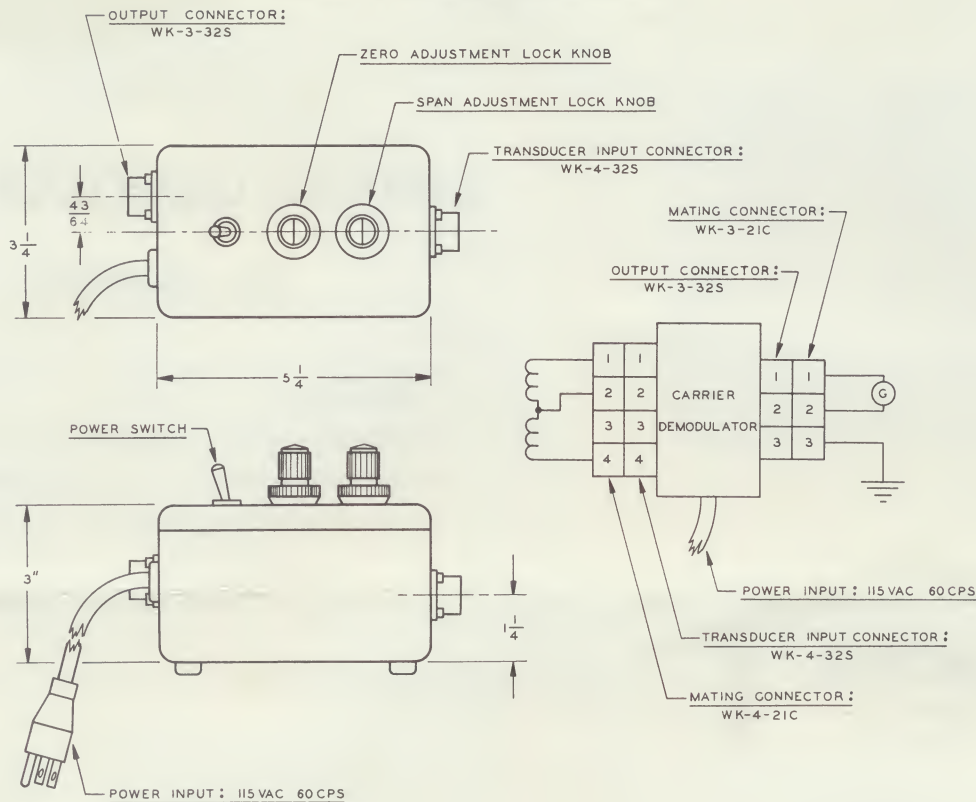
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## INSTALLATION DRAWING

### Model CD10 Carrier Demodulator

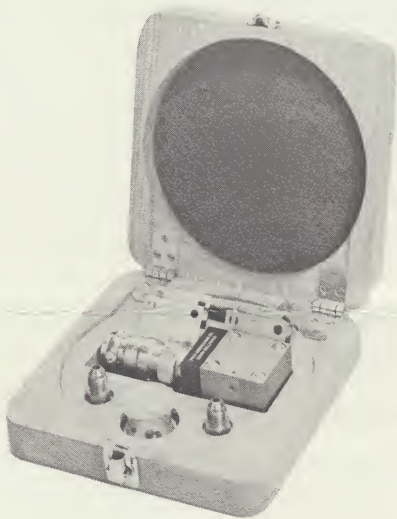


Design improvements may be made without prior announcement.

For Models to meet special requirements, consult our Engineering staff.

Collect calls will be accepted for application and engineering assistance.

### Model KP15 Pressure Transducer Kit



When used in conjunction with the Model C10 Carrier-Demodulator, the PACE Model KP15 Pressure Transducer Kit provides users with a complete transducer test laboratory. Featuring Accuracy of 1% of Reading from 1 to 500 psi, differential or gage, the Model KP15 Transducer Kit includes a PACE Model P15 Pressure Transducer rated at 2000 psi maximum line pressure, five bi-directional, interchangeable diaphragms with ranges of  $\pm 1$ ,  $\pm 5$ ,  $\pm 25$ ,  $\pm 100$  and  $\pm 500$  psi, wrenches and accessory fittings. Its split body design permits simple disassembly (only four bolts) diaphragm replacement and reassembly. Designed for use with corrosive liquids and gases, both sides, it incorporates vent valves to facilitate complete liquid filling for dynamic measurement. The variable reluctance type transducer kit, intended for general test laboratory use, eliminates the need to stock several individual transducers. Detailed information on the Model KP15 Pressure Transducer Kit is included in the complete PACE Catalog, available on request.

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